METRO ATLANTA WATER RESOURCES OVERVIEW

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Abstract. An overview of water resources issues in the Atlanta region of north Georgia. This paper includes a discussion of stormwater and nonpoint source pollution, TMDLs, municipal wastewater treatment and water supply challenges and issues in the 10 county Atlanta region.

INTRODUCTION

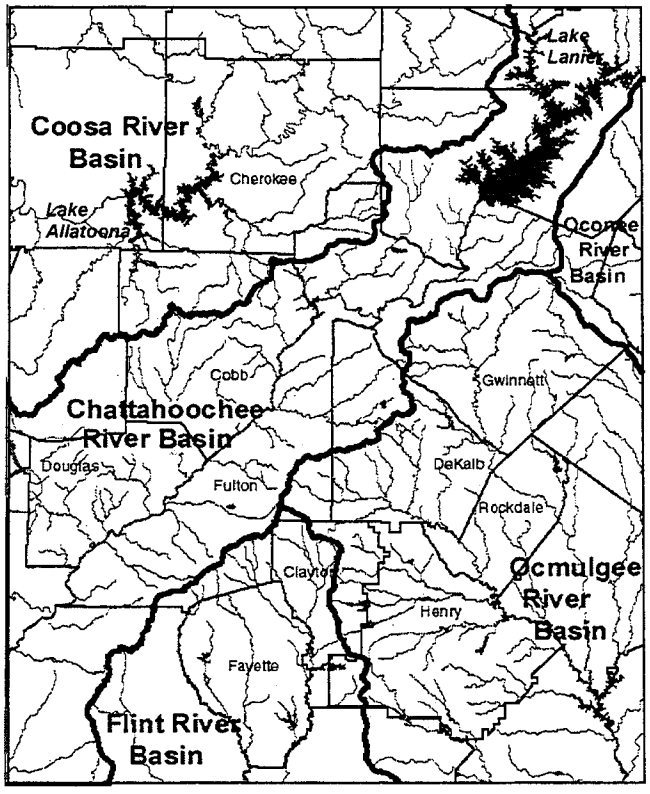
Water quality and water supply are critical issues that will affect the Atlanta region's future economic viability and quality of life. The water resource challenges facing the Atlanta metropolitan area are complex. The solutions will require increased efforts and a comprehensive approach that involves all levels of government, the business community, environmental groups and the public. The purpose of this paper is to provide an overview of the water resources challenges in the Atlanta metropolitan region.

BACKGROUND: SMALL RIVERS CREATE WATER MANAGEMENT CHALLENGES

Surface water – streams, rivers and reservoirs -- provides 98% of the Atlanta region's water supply. Groundwater is limited due to the nonporous bedrock, exemplified by Stone Mountain granite. Even though the area averages 50 inches of rainfall per year, most of our rivers are small headwater rivers that begin near the ridgelines that cross the region. The region is located on a subcontinental divide. About two-thirds of the metro area is drained by the Chattahoochee, Etowah and Flint rivers, which are part of larger river basins which flow to the Gulf of Mexico. The Chattahoochee and Flint rivers are part of the Apalachicola-Chattahoochee-Flint (ACF) River Basin. The Etowah River is part of the Alabama-Coosa-Tallapoosa (ACT) River Basin. The rest of the area is drained by rivers that are part of the Ocmulgee-Oconee-Altamaha River Basin, which flows to the Atlantic Ocean.

The Chattahoochee River is our largest river. It begins in north Georgia near Helen. As a result of the leadership of Atlanta's Mayor Hartsfield and Senator Russell, the U.S. Army Corps of Engineers impounded it at Buford Dam to create Lake Lanier in the 1950's. This reservoir created a managed and reliable source of water for the Atlanta region. Lake Lanier and the Chattahoochee River directly provide 72% of metro Atlanta's water supply and receive the major wastewater treatment plant discharges. The Chattahoochee River Basin is a narrow relatively small river basin. In fact, with respect to drainage area, it is one of the smallest river basins providing most of the water resource needs for any major metro area in the country. Lake Allatoona and the Etowah River supply another 12% of our water supply needs.

Map 1 illustrates the major basins in the Atlanta region and Figure 1 summarizes all the withdrawals and discharges by the basins.



Map 1. Major basins in the Atlanta region.

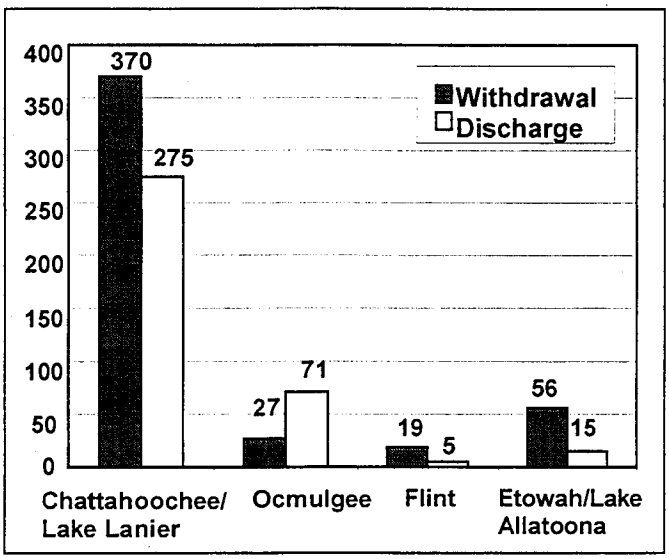


Figure 1. Withdrawal and discharge by basin.

WATER QUALITY ISSUES

Stormwater Runoff and Non-point Source Pollution Problem. Stormwater runoff and nonpoint source pollution are major sources of water pollution. The Georgia Department of Natural Resources, as required by sections 305(b) and 303(d) of the Clean Water Act, lists water bodies supporting, partially supporting and not supporting their designated uses (fishing, recreation, water supply, etc.) based on monitoring data collected. The most recent 305(b)/303(d) list of waters found that 857 stream miles and 132 different stream segments in the 10 county Atlanta region were violating state water quality standards. Over 80% of the stream segments were listed as a result of pollution associated with urban stormwater runoff. These stream segments only represent the waters tested. More violations will be found as monitoring efforts are expanded and more waters are tested.

Stormwater runoff from the metro area threatens our water supplies, it destroys streambeds and aquatic habitat, and it threatens our recreation lakes such as lakes Lanier, Allatoona, West Point and Jackson.

Stormwater runoff must be controlled not only at the site level but also at the watershed level. A variety of stormwater control best management practices are needed for areas of development and re-development. Examples include:

Structural Controls	Non-Structural Controls
Retention Ponds	Limiting Land Disturbance
Stormwater Wetlands	Preserving Steep Slopes
Infiltration Trenches	Stream Buffers
Sand Filters	Limiting Impervious Surfaces
Organic Filters	Environmentally Sensitive Design
Bioretention	
Vegetated Swales	

Existing development will also need to be retrofitted with stormwater controls to deal with existing problems. There also needs to be some control policy and direction at the regional level to ensure consistency in the use of stormwater controls across jurisdictional boundaries and to create a "level playing field" for the development community in the Atlanta region. Stormwater solutions also need to be coordinated and integrated with land use planning and other community planning needs and investments to ensure public policies are mutually supportive and don't conflict.

One project to address the control of stormwater is the Georgia Stormwater Management Design Manual. This is a collaborative effort of 30 local jurisdictions and the state, facilitated and managed by ARC staff. The Manual will be a comprehensive urban stormwater management design manual. It will detail stormwater management techniques, provide criteria and rationales for the selection of structural and nonstructural water quantity and quality controls and best management practices (BMP's). The manual will emphasize a watershed approach in which the entire impact of a proposed development on downstream hydrology, conveyance systems, and water quality is considered.

Total Maximum Daily Loads (TMDLs). In the past water pollution control efforts have focused primarily on point sources. Recent court cases throughout the nation have changed that focus. In 1996, the Sierra Club successfully sued the U.S. EPA to force the control of pollutant loads from non-point source pollution in Georgia as well. The lawsuit required the EPA, and thus the state of Georgia, to set and enforce total maximum daily loads (TMDLs) on all streams with water quality violations. A TMDL is the limit on the total amount of pollution a water body can receive without violating water quality standards. It is equivalent to the total of the municipal and industrial discharges (point sources) plus stormwater (nonpoint sources) plus a safety factor.

TMDL = Point Sources Load + Non-point Load + Safety Factor

TMDLs now link wastewater plant discharges to stormwater mitigation efforts.

Due to the court case, the schedule for the development of TMDLs in Georgia is the most aggressive in the nation. The TMDLs must also include an implementation plan that includes specific actions, schedule, legal authorities and reasonable assurance that the TMDL will be met. The deadlines for developing TMDLS as follows:

June 2001 - Ocmulgee River Basin
June 2002 - Chattahoochee/Flint River Basin
June 2003 - Coosa/Etowah River Basin

The solutions to implement TMDLs will primarily be the responsibility of local governments. Local governments will be called on to require and enforce the stormwater control best management practices listed above. Local governments will also need to consider the watershed-wide aspects of stormwater management.

Municipal Wastewater Treatment Facilities. We use our rivers, streams and lakes to assimilate treated wastewater. Because most of these water bodies are relatively small or sensitive, the ability to assimilate wastewater is limited. Additionally, many of the wastewater treatment plants in the region are at or are nearing their existing capacity. In order to accommodate growth, the traditional treatment levels are not sufficient. In fact, Atlanta region wastewater treatment plants will need to provide the highest level of treatment in the southeast (and maybe the U.S.).

Chattahoochee River - Since this is our largest river, most of the region's major wastewater discharges are to the Chattahoochee River. In 1992, ARC completed a Wastewater Study for the Chattahoochee River Basin that recommended major expansions of all municipal treatment facilities. The State had to develop a new River Water Quality Model to judge and respond to the recommendations. Expansions to plants along the river have been put on hold for the past several years while the State developed a new model. The model was completed in 1999 and shows that nearly all the wastewater plants will need to be upgraded to very high levels of treatment and the heat loads from the four Georgia Power plants will need to be removed to protect the river as the region continues to grow. ARC is working with the local governments and the Georgia Power Company to develop a phased strategy and wasteload allocations. to protect the river. Rough cost estimates for the improvements and expansions are estimated at $2 to $4 billion dollars. More detailed cost estimates will be developed.

Other Rivers - Those counties that do not discharge to the Chattahoochee River have even greater challenges since the streams they discharge to are even smaller. Accommodating increased wastewater discharge in counties such as Rockdale, Clayton, Fayette will require special attention to meet these challenges. Options that may be considered are land application, wetlands treatment, reuse, and use of on-site systems.

Operational Reliability - In the past decade the Atlanta region has experienced a number of major wastewater spills and operational problems that dumped untreated or partially treated wastewater into rivers or streams. As the wastewater facilities expand, the public needs greater assurance that this will not happen again. Increased redundancy of equipment, power sources and other safeguards need to be clear requirements of expansions.

Conveyance Infrastructure - Sewer surcharges and overloaded major interceptors and conveyance systems are a problem in a number of places. Also, there is a general concern that sufficient expenditures are not being made to maintain the systems, especially the older systems. Measures of adequacy need to be determined and each system should be evaluated against these measures on a regular basis. Potential solutions include: more rigorous Infiltration and Inflow (I/I) reduction programs; increased line capacity – parallel relief lines, tunnels; ongoing programs of major replacement and repair; and connecting development approvals to both treatment plant capacity and conveyance system capacity as a matter of routine. No approval of development plans, rezonings, or building permits should take place without adequate wastewater treatment and conveyance capacity available.

Combined Sewer Overflows (CSOs). Combined sewers carry both stormwater and sewage in the same pipe and were designed to overflow into streams during heavy rainfall events. Such sewers were built 100 years ago and in the metro area only occur in the City of Atlanta in the older central part of town. The Atlanta CSOs have been the focus of court cases and enforcement orders for years. In 1998, the City of Atlanta signed a Consent Decree that addressed CSOs and committed the City to a number of other programs to improve water quality in streams. The Consent

Decree includes specific actions the City will undertake to identify remedial measures for the CSO facilities, conduct a stream cleaning and implement a greenway acquisition program. The CSO remediation plan may include sewer separation and stormwater ponds and storage and treatment. The plan is due to the EPA by April 1, 2001 and the City is required to fix the CSOs by 2007.

WATER SUPPLY ISSUES

Almost 500 million gallons per day (MGD) are withdrawn from water supply sources in the 10-county area and supplied to 16 counties and over 70 cities. The most important supply sources are the Chattahoochee River/Lake Lanier and the Etowah River/Allatoona Lake, which together provide 85% of the region's total water supply.

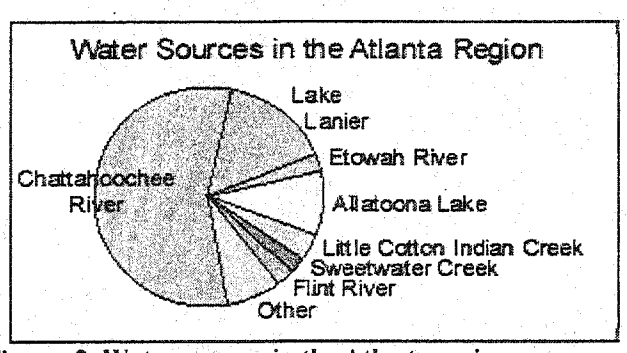


Figure. 2 Water sources in the Atlanta region.

Per capita water use is the total water usage in a given area divided by that area's population, resulting in a measure of water use per person. For the 10-county ARC region as a whole, the per capita use is 149gpcd. Total water use can also be broken down into use by the major sectors of demand. The largest part of our water demand is due to residential (domestic) use. On average, indoor residential water consumption is approximately 64 gallons per day. Outdoor water use can vary considerably.

Atlanta Region Water Demand by Major Use

Residential	53.8%
Commercial	22.8%
Government	5.6%
Industrial	4.2%
Other*	13.6%

*Other includes water used in water treatment processes, water main cleaning, fire fighting, and other uses as well as water lost due to system leakage.

The ARC Regional Water Supply Plan, adopted in 1997, identifies future sources of water supply and recommends allocation and timing of withdrawals for jurisdictions in the Atlanta region to meet the needs through 2020. Water conservation will be essential to meet future water needs and is included in future forecasts. However, even with water conservation increased water allocations will be needed from Lakes Lanier and Allatoona and from the Chattahoochee and Etowah rivers. Groundwater can be expected to supply about five percent of total future water demand.

Tri-State Water Negotiations. In 1997, the states of Alabama, Florida and Georgia adopted Interstate Water Compacts and are currently negotiating the allocation of water in the ACF (Apalachicola-Chattahoochee-Flint) and ACT (Alabama-Chattahoochee-Flint) river basins under these compacts. It appears that the potential limit on the amount of water that will be available from these river basins is equivalent to the amount forecasted for the year 2030.

If the states cannot agree on an allocation formula, which is also acceptable to the federal commissioner, the compacts will be dissolved and the dispute may then return to the courts. Of primary concern is the operation of Lake Lanier to protect the current and future water supply for the Atlanta.

Over three million people in metro Atlanta depend on the storage in Lake Lanier for water supply. Lake Lanier is the northernmost reservoir in the ACF basin. It is the single largest reservoir in the system. But it is also important to understand the limitations of this lake in the headwaters of the river basin. Lake Lanier only has 5% of the ACF River Basin drainage area above it and it controls only a very small part of the water in the basin. This means that almost all of the rainfall that flows into the river system comes in below Lake Lanier. While Lanier is 50% of the storage in the system, it is important to not overestimate the ability of this storage to make a significant difference in the river flows in Florida. Even with the influence of storage from Lanier and the other reservoirs on the system, the river as it flows into Apalachicola Bay is typically 13 times the size it is at Atlanta. Lanier contributes less than 10% of the flow at the state line.

Large releases may help downstream over the short term, but large releases from Lanier during an extended drought to create artificially high flows in the Apalachicola River will imperil this critical water supply source.

This was made clearer by actions last summer. In April and early May 2000, water was released from the lower reservoirs (George and Woodruff) to support navigation in the lower ACF river system. During a 10 day navigation window the Corps released enough water to supply all of metro Atlanta's water needs for several years. Those releases emptied the George and Woodruff reservoirs. The Corps then made major releases from Lake Lanier at a rate of 5 times the rate water was flowing into Lanier in a vain attempt to refill the lower reservoirs. Lanier dropped at an alarming rate. Subsequently the lower lakes recovered due to winter rains, but Lake Lanier is now at record low levels due those releases last year, and there is as yet no end in sight to this drought.

Stopping growth in metro Atlanta will not substantially change the water budget in the ACF Basin. The fact is, if every man, woman and child in metro Atlanta were to disappear, Florida would not notice a perceptible difference in water flows. Metro Atlanta's total consumption represents a less than 1 percent of the flow in the Apalachicola River at the state line during normal times and only 4 percent during drought times. Atlanta could stop using water altogether with virtually no impact on minimum flow targets in the Apalachicola River. Atlanta's consumption is not a significant factor.

Lake Lanier, though it is the largest reservoir, is a small part of the supply compared to the volume of water in the lower river basin. Lake Lanier, as a headwaters reservoir can serve as the water supply for the Atlanta metro area, but cannot serve as the cure-all for drought conditions in the lower part of the basin. If Lake Lanier is used for lower basin flow targets in drought, it will put the welfare of over three million people in jeopardy and not significantly alleviate drought conditions in Florida.

Water Conservation. Although the Atlanta region has implemented a number of water conservation measures and programs, continued and increased efforts are needed to meet the region's future needs.

Among the measures being used are conservation pricing, numerous education programs beginning with schools, as well as community presentations. The individual counties are imposing water restrictions and promoting xeriscaping (low water-use landscaping) principles. Local governments are enforcing mandated plumbing codes, requiring ultra low flow fixtures and implementing integrity programs for leak detection. Treated wastewater is being routinely utilized on golf courses. Most of these local water utilities use bill inserts and newsletters to remind consumers about the need for water conservation.

South Metro Area. Fayette, Clayton, Henry, and Rockdale Counties have limited future water supply options. These counties are not adjacent to any of the region's major water supply sources and are located at the headwaters of the Flint and Ocmulgee river basins. For this reason, streams and rivers located in these counties are even smaller, requiring that impoundments be developed in order to utilize them for water supply purposes. Most of the reservoirs in the south metro area typically have safe yields of less that 20 mgd. In addition, several of these streams have impaired water quality due to upstream urban runoff pollution and treated wastewater discharges. Currently, the water quality in both the South and Yellow Rivers is not acceptable for water supply use.

Most of the available water supply sources in the south metro area have already been developed or are in the process of being planned or constructed. Work needs to increase to address this area's water needs beyond 2020.

Beyond 2030. Securing water supplies beyond those local sources available will be very difficult. It will require the combined financial resources and influence of both local and state agencies. It will also take considerable time to secure.

Source Assessment and Protection of Water Supply Watersheds. The Atlanta region has 28 water supply intakes in 20 different water supply watersheds. These watersheds have been and need to continue to be the focus of protection efforts. Many of these watersheds encompass multiple jurisdictions.

Among past efforts include the buffer requirements along the Chattahoochee River due to the Metropolitan River Protection Act. Also, small water supply watersheds are subject to minimum protection criteria from the Georgia Department of Natural Resources under the 1989 Georgia Growth Strategies legislation, which includes stream buffers and limits on impervious surface. A new requirement and opportunity that is being undertaken is the Source Water Assessment Program. The 1996 Federal Safe Drinking Water Act amendments requires state and thus drinking water suppliers to conduct Source Water Assessments and encourages the development of measures to prevent the pollution of drinking water. ARC is working with local water utilities and the Georgia EPD to conduct a source assessment for intakes in the Atlanta region.

FACING THE CHALLENGES

In 1998, ARC created a Regional Water and Sewer Study Commission to review and discuss the water resources problems facing the region and provide recommendations. In 1999, the Commission concluded that the water resources problems facing the Atlanta metro area were urgent and needed regional cooperation to avoid a crisis. It recommended a regional Integrated Water Resources Plan, a regional stormwater organization and a formal organization and process to address the water problems identified. Building on that effort, the Metro Atlanta Chamber and the Regional Business Coalition followed this work in 2000 with a larger effort called the Clean Water Initiative. This initiative recommended a Metro Atlanta Water Planning District to prepare regional stormwater, wastewater and water supply plans for a 16-county metro area. Legislation has been introduced which builds upon the findings of both efforts and creates a North Georgia Metro Water Planning District.

SUMMARY

The Atlanta region is facing complex water resources problems in large part due to the geography and small streams in the area. The problems need to be addressed in a committed, cooperative, comprehensive and enforceable manner that builds upon ongoing work.

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